Valuing environmental attributes of MPAs in the market price of real estate, Moreton Bay, Queensland, Australia

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1.0 Introduction

The amenity attributes of a marine landscape, including visual landscape, wildlife, flora, open space, clean water, absence of noise, etc., are normally treated as an economic benefit and the loss of such values as a form of negative externality or undesirable spillover from industry or development. Amenity attributes are not private goods. It is not possible to exclude others from enjoying them and, in many cases, the enjoyment of these attributes by one person does not necessarily reduce the enjoyment by others. In short, there are no property rights over these amenities and hence, if their provision were left to the market, supply would be less than efficient. The failure of the market to produce such amenity values or attributes suggests that there is a role for government to ensure their provision to maximize benefits for society as a whole. This study is concerned with identifying and estimating a value for environmental attributes provided by marine park areas, and specifically environmental attributes resulting from the 2009 re-zoning of the Moreton Bay Marine Park by the Queensland Department of the Environment and Resource Management.

2.0 Valuing amenity services

Garrod and Willis (1992) argue that environmental attributes, such as those offered by marine park areas, are not pure public goods. They contend that consumers have the option of “buying” or consuming these attributes as a joint product (with a house, a job or type of leisure activity) and that varying levels of amenity attributes are provided in varying quantities in different spatial areas. However, there is no explicit market for environmental attributes. They suggest that households are prepared to pay to reside in close proximity to areas with good quality

environmental attributes. By paying a premium for a property in close proximity to an area offering quality environmental attributes, consumers are signalling a willingness to pay (WTP).

Estimates of a value for improvements in environmental attributes provided by management of the users of marine areas is important information for decision makers, specifically indicating the level to which consumers are WTP for improvements, or to maintain the current level of quality. As the standard evaluation approach for public sector investment in Queensland is cost-benefit analysis (CBA) which requires monetary values for all costs and benefits associated with investment, estimates of WTP for any improvement in environmental attributes resulting from the re-zoning of the MBMP, is valuable information.

A number of valuation techniques are available to value environmental amenities, including travel cost and hedonic price methods (HPM) which value the environment using revealed preference techniques and contingent valuation techniques (CVT) such as choice modeling which is increasingly used in Australia for estimating the total economic value of the environment, and uses stated preference techniques.

The purpose of this study is to estimate any change in the value of property in close proximity to Moreton Bay that could be attributable to a perception of an improvement in the marine environment as a result of the re-zoning of the Bay in 2009. As this study is concerned with estimating the value of a marginal change in the value of property in the area, the most appropriate valuation technique is a HPM.

3.0 Hedonic Pricing Method

HPM adopts consumer theory (Lancaster, 1966) which recognises that the utility of a good is related to the attributes of the good. Because each property represents a unique combination of attributes, the price the consumer is willing to pay for a property will be determined by a range of attributes and the degree to which these attributes are provided by the property. This approach derives the value of specific attributes of a property by undertaking regression analysis which differentiates property values based on a range of attributes including physical characteristics, accessibility to services, neighbourhood and environmental characteristics such as view, water frontage and vegetation cover, and, future development potential.

More formally, let P represent the product, in this case, the property. Any unit of P, P_i, can be comprehensively described by a vector of its characteristics. If T_j, A_k, L_m and E_q indicate the vector of tangible site characteristics, access, location and environmental variables respectively, then the price of P_i is a function of the levels of those characteristics:

$$P_{pi} , = P_p (T_{ii}, \ldots, T_{ij}, A_{i1},\ldots, A_{ik}, L_{i1}, \ldots, L_{im}, E_{i1},\ldots, E_{iq}). \quad (1)$$

The function P_p is the hedonic or implicit price function for P.

In brief, a household's marginal benefit for a small improvement in environmental amenities is its marginal WTP for that specified attribute – estimated by the marginal implicit price of that specified property characteristic. In brief, HPM uses house sale prices in the suburbs surrounding the environmental area, in this case Moreton Bay, to observe whether, once all other factors influencing house prices in the area are held constant, there is a premium being paid for houses that are closer to the Bay compared with the same house if it were located further from the Bay. This premium reflects the community's WTP for a location near the Bay. This approach to valuing environmental attributes is termed a revealed preference valuation technique, using actual market transactions to estimate a value for the environmental assets offered by the Bay.

Hodgkinson and Valadkhani (2009) argue that as the purchase of a house is considered one of the most significant investment commitments made by Australian households, it can be expected that such purchases involve careful consideration of the value of the house being purchased, compared with the available alternatives. They argue that if it can be shown that a premium is

being paid for proximity to the environmental study site, this is a genuine reflection of their valuation of the ‘‘user’’ benefits of the study site.

HPM techniques have attracted considerable criticism. Criticisms include their ability to estimate the value of particular attributes rather than their ability to predict the overall price of the good, a criticism which is particularly important where the value of a specific environmental attribute is the objective of the study (Ozanne and Malpezzi, 1985).

Previous HPM studies

HPM is not often used in Australia to value environmental attributes, possibly due to the extensive data requirements to conduct these studies. Curtis and Lockwood (2001) undertook a study to value remnant native vegetation of rural properties in the Goulburn-Broken catchment area, Victoria, NSW. The results were largely inconclusive because there were insufficient property sales in the area to enable the vegetation to be valued. In the context of water quality improvements, a review of the literature revealed only one study that used HPM to value environmental quality in a coastal waterway in Australia. Hodgkinson and Valadkhani (2009) used a commercially available data-base to estimate the value residents were willing to pay to live in close proximity to Lake Illawarra, coastal NSW, where the foreshore amenities were upgraded and the degraded water quality was undergoing substantial restoration. Over 500 data points were used in the analysis.

4.0 The Moreton Bay Marine Park

While it is possible for biophysical scientists to put forward information to demonstrate the biophysical changes in the quality of the marine environment of Moreton Bay since the Bay was first managed in 1998 by restricting the use of areas of conservation value, the amount of change annually is virtually imperceptible. As a result, to correlate change in environmental quality over time to a change in property prices in the area is unlikely to reveal credible information. To separate any change in property prices in the areas adjacent to the MBMP, the marginal change in environmental attributes would need to be estimated by investigating changes in environmental attributes and property prices over space.

Over the period since the re-zoning of Moreton Bay, from 2009 to 2010, we determined that property sales in relatively close proximity to the Bay were relatively few (approximately 45). A statistically reliable number of observations was not possible. Previous studies that had reported an estimate for the value of improved quality of the environment have had access to a substantial number of sales (for example, the Hodgkinson and Valadkhani (2009) study of Lake Illawarra had over 500) so that it was possible to separate and estimate a WTP for a specific attribute.

However, a survey of over 20 Real Estate businesses around Moreton Bay was conducted using semi-structured interviewing techniques. The most important question posed by the survey was whether the estate agents identified the expected improvements likely to result from the re-zoning as a positive attribute to market homes in the vicinity of the Bay.

Although 3 or 15% of agents interviewed indicated that they had possibly mentioned this factor in their sales pitch, none of these agents considered the marine park status had added a premium to the house price or that it had been an attribute about which buyers were interested.

A view of the Bay, and the extent of the view was a more important consideration for buyers. It would seem that any property in relative close proximity to the Bay had increased in value over the past 5 years but that this was in keeping with increases in property values across Brisbane where the property was in close proximity to water, river or Bay.

Interviews with Real Estate agents were followed up with a number of interviews of persons who had recently (since the re-zoning) purchased property around the Bay. Of the 30 people interviewed, approximately 66% indicated that they regularly (at least once a fortnight) used the amenities offered by the Bay. Walking, jogging, cycling, sailing and recreational fishing were listed as the main uses, with walking and jogging attracting 85% of those who regularly use the land immediately adjacent to the Bay. Sailing and recreational fishing were not regarded as regular activities for the Bay. However participation in sailing was more regularly undertaken than recreational fishing. Access to recreational amenities, such as jogging and walking track were more important than access to the marine environment.

Again the question was posed about their WTP for a property in close proximity to the Marine Park motivated by the likely improvements in the ecosystem health as a result of the re-zoning. None of the people interviewed indicated that improved ecosystem health was a motivation or

factor for consideration in their purchase of property. Interestingly, nobody interviewed suggested that property in close proximity to Moreton Bay would lose value due to the marine park.

5.0 Conclusions

The purpose of this study was to estimate any change in the value of property in close proximity to Moreton Bay that could be attributable to a perception of an improvement in the marine environment as a result of the re-zoning of the Bay in 2009. The most appropriate valuation technique for this study was identified as hedonic pricing (HP).

HP requires a substantial data set (approximately 500 data points) to enable individual property attributes to be valued. Unfortunately, the number of property sales in 2010 within one kilometer of Moreton Bay since the re-zoning in 2009 was insufficient to undertake a meaningful statistical analysis. However, surveys were conducted of a number of real estate agencies operating in these areas and interviews were undertaken of a number of people who had purchased property in close proximity to the Bay.

Improvement in ecosystem health likely to result from the re-zoning of the marine park was not identified as an attribute adding a premium to property values.

Although amenity values within the marine park, such as recreational fishing, have been improved subsequent to the re-zoning, including exclusion of commercial fishing activities from popular recreational fishing areas such as Peel Island and the installation of artificial reefs, boat ramps and fishing platforms, these improvements do not necessarily increase the enjoyment and attraction of living adjacent to the marine park unless residents are users of these amenities. Any improvements resulting from the marine park re-zoning will be mostly in relation to the health of ecosystems which are expected to result in increased areas of fish habitat and ultimately impact on fish catches. Any observable improvements in ecosystem health could take many years to become apparent. Moreover, an improvement in water quality in Moreton Bay in the near future is unlikely and is not anticipated to be an outcome from the marine park but from activities

associated with reducing point-source discharge from waste water treatment plants and reduction of diffuse sources of sediment and nutrient discharge from land-based activities.

As the view of the water over Moreton Bay was identified by real estate agents as a positive attribute for property values, rather than the quality of the water or access to recreational fishing areas, this report concludes that the re-zoning of Moreton Bay has had no discernible impact on housing prices in close proximity to the Bay.

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